THE ROLE OF INTERNAL AND EXTERNAL SHOCKS IN MACROECONOMIC FLUCTUATIONS OF DEVELOPING COUNTRIES

ShaziaKousar, MahwishZafar, Pirzada Sami UllahSabri, M.Ilyas and Nadia Nasir
Superior university 17km off Raiwind Road Lahore
shazia.kousar@superior.edu.pk, Mahwish.wajahat@yahoo.com, Pirzadasami@yahoo.com, m.ilyas@superior.edu.pk,
nadia .nasir@superior.edu.pk

ABSTRACT: *This study empirically investigates those factors, domestic or international, play important role in economic fluctuation. This study quantifies the impact of domestic, monetary and fiscal policy, and international variables, foreign direct investment, foreign aid, trade openness, on economic fluctuations in 40 low and middle income countries by using panel vector auto regression model over the period of 1960-2013. Study assesses the impulse response functions and variance decomposition of developing economy, s fluctuations. The results show that 80% variation in GDP due to innovations is caused by itself. However, the contribution of domestic policy variables is negligible while contribution of FDI, ODA, and trade openness is overt in economic fluctuation.*

Key Word: fluctuation, liberalization, fiscal and monetary policy, FDI, ODA

INTRODUCTION:

Before 1930s, irregular ups and downs in economic activities were seen periodically and considered to be the normal fact of life. When the event of great depression left tragic effects on the economies of the world, economists felt the need to recognize different internal and external shocks to smooth economic fluctuations [1]. Since then, theoretical and empirical literature has documented different kinds of shocks but still it is far from consensus. This study contributes by identifying a common set of internal and external shocks that contribute in macroeconomic fluctuation. In theoretical literature, back to 1960, Keynesian economists believed that fiscal policy plays stabilizing role during economic disturbance. At time of depression Govt. should interfere and adopt expansionary fiscal policy to help and save the economy. Thus, literature recommend the counter cyclical role of fiscal policy but in developing countries the observed role of fiscal policy is pro cyclical and aggravate business fluctuations rather than stabilization [2-4]. Narrow and rigid tax structure in developing economies makes prevention in appropriate execution of fiscal policy [5]. Thus, absence of well-knit and integrated tax policies destabilizes the economic activities rather than stabilizing them. Moreover, fiscal policy with annual budget deficit of more than 1 trillion became inadequate to stabilize business cycle during 2008,s recession in U.S economy [6]. However, fiscal policy with efficient institution can play significant role to stabilize the economy [7].

In the last decade of sixties monetarists strongly attacked on Keynesian thoughts and pointed out his famous "K-percent" money growth rule to stabilize economic fluctuations [8]. However, predominant findings recognized that exogenous shocks to monetary policy significantly contribute in economic fluctuations. The effect of unexpected monetary policy is six times larger on output than typical estimates [9]. The contribution of monetary policy innovations in economic disturbance is puzzling and understudied. In US economy during 2008 recession, Federal Reserve Board decreased interest rate to its minimum level to control rapid decline in economic activities but policy failed to produced desire results [6]. In contrast some empirical studies testified a decisive role of monetary policy in price and output stability [10]. Therefore, literature regarding importance of policy

variables in macro-economic fluctuation is confused and unsettled [11, 12], needed to be re-addressed.

In low income countries economic activities are greatly unstable and influenced by internal as well as external shock. The variation in output is two to five time larger in developing nations as compare to developed countries. Low income countries with some structural characteristic like dependence on foreign trade, higher reliance on FDI and foreign aid are more open to external shocks. The list of structural characteristics instructs that business activities in poor countries depend on factors that are beyond the reach of their policy makers. Thus, if policy maker are failed to utilize these resource appropriately it will cause to upset the economic activities. This problem enlightens quantitative effect of external and internal shocks and their relative importance in macroeconomic fluctuation. Some studies emphasized that external shocks are more responsible for fluctuations in developing nations [13, 14]. In difference some studies found a small but significant contribution of external shocks and suggest that internal causes can be main potential source of fluctuations [15]. During the last three decades, structural vector auto regressive (SVAR) model is used as a tool to investigate the effectiveness of domestic and external shocks [13]. However, the reliance of developing countries on foreign resources for growth and its impact on macroeconomic fluctuations is neglected in literature.

The objective of this study is to investigate effect of external shocks like trade openness, FDI, foreign aid, and internal policy shocks on economic fluctuation in developing countries.

Literature Review:

Domestic Shocks and Macroeconomic Fluctuation:

In empirical literature, total volume of goods and services are strongly affected by fiscal policy and almost 30% difference in economic growth across the countries is caused by difference in their tax system [16, 17]. Therefore, in developed countries, the fiscal policy is more effective and significantly stabilizes economic fluctuation. Among the various components of fiscal policy, social welfare system like subsidies and transfers in OECD countries show the strongest counter-cyclical response and works as an automatic stabilizer [18]. In contrast some studies found that expansionary fiscal policy eventually cause to crowd out private investment and negative wealth and substitution

effects on private investments offset the increase in govt. expenditure and as result fiscal policy fail to play stabilizing role in economic fluctuations [19]. In past decades it has been analyzed that over ambitious macroeconomic policies intensify the macroeconomic disturbances rather than to smooth these fluctuation [20]. One stand of empirical literature is that nominal money does not play any role in output and inflation stabilization, [21], while other stand is that monetary policy has little statistical role economic instability [22]. However, monetary policy and fiscal policy has minor role in investment, consumption, and output fluctuation [23]. Thus, unsurprisingly along indecisive theoretical research regarding the relative power and usefulness of fiscal and monetary policy, empirical research also has not offered conclusive evidence.

External Shocks and Macroeconomic Fluctuations:

The importance of external shocks in economic fluctuation is first time investigated by [24]. Study found that the greater variations in economic fluctuations are explained by external shocks in developing economies during the period of 1988-1991. Monetary shocks of US economy have spillover effect on developing countries [25]. Moreover, developing nations are more exposed to outdoor shock than large and developed nations [26]. Furthermore, in Latin America macroeconomic fluctuations are largely caused by external shocks. However, some studies found small contribution of external shocks in macroeconomic fluctuations [27]. Most of the studies investigated external shock like US monetary policy and oil price are significant source of economic fluctuations [26, 28, 29]. In empirical literature many other alternative external factors like production asymmetries [30], Financial integration [31, 32], global shock [33], currency union membership or free trade agreements [34], distance, common border and other gravity model variables [35], Human capital differences [36], Differences in abundance of production factors [35], Exchange rate volatility [34], have been considered for their significant contribution in macroeconomic fluctuations. However, contribution of reliance on foreign resources, trade openness, foreign direct investment and foreign aid, is less researched area and needed to be investigation.

Trade Openness, Fdi and Foreign Aid and Fluctuations:

Globalization" integrates the world economies for more trade and promotes the opportunities of economic growth. Vast literature concentrated the relationship of trade openness and economic growth. However, the relationship between openness and economic fluctuation is relatively a new area of research and addressed by a few studies. In this context empirical literature failed to reach on a consensus that countries with large degree of openness have greater variation in output fluctuation. Although in developing countries a number of factor affect degree of fluctuation in macro-economic variables but some empirical studies found that financial market integration heightened the universal spillovers of macroeconomic fluctuations [37]. Moreover, trade liberalization has potential to disrupt the economy by producing strong variations in investment [38]. Another study found that trade openness significantly contribute in macroeconomic fluctuations [39,40], carefully portrayed inverse U-shaped relationship between output variability and

openness. Another theoretical model developed by [41], explain negative relationship between trade openness and macroeconomic fluctuation. However, empirical literature on relationship between trade openness and economic fluctuations is small and inconclusive. On one hand some studies found insignificant relationship among trade openness and business cycle [37, 42], while on the other hand, some studies found positive and significant association of financial liberalization with output fluctuation in a sample of 24 OECD countries [37]. Another study with cross section of 48 developing countries found that trade openness negatively affect economic fluctuations [41]. Conclusively developing countries exposure to external shock and their vulnerability can give birth to macroeconomic instability. This study contributes in the literature by investigating the relationship and contribution of trade openness in macroeconomic fluctuation.

No doubt, foreign aid provides relief in emergencies; it also acts as fuel to economic growth. although aid exclusively foster growth but its disbursement patterns give birth to output fluctuation in developing countries is a matter of serious concerns [43]. Although large body of literature discuss link between foreign aid and economic growth [44] and business cycle properties of foreign aid [45, 46] but the contribution of foreign aid in macroeconomic fluctuation is under researched area. Volatility of foreign aid is blamed for volatile economic performance in developing countries. Similarly empirical literature gives scant importance to foreign direct investment and its relationship with economic fluctuation [47]. However, foreign bank loan may have significant impact on output fluctuation [48]. The first objective of this study is to investigate the role of domestic policy variable in economic fluctuation and second objective is to investigate the role of external variables which can affect economic output but are beyond policy research.

Hypothesis:

1. Does monetary policy contribute in economic fluctuation?
2. Does fiscal policy contribute in economic fluctuation?
3. What is relative contribution of monetary and fiscal policy in economic fluctuations?
4. Does FDI contribute in macro-economic fluctuation in developing economies?
5. Does trade openness contribute in macro-economic fluctuation in developing economies?
6. Does foreign aid contribute in macro-economic fluctuation in developing economies?

METHODOLOGY:

Panel vector auto regression is used to examine the role of internal and external shocks in economic fluctuation of developing countries. A panel VAR is useful for several advantages like low serial correlation in residuals, summarizing time series facts, simplify complex relationship among variables, policy analysis, structural implications and helpful for describing and forecasting dynamic behavior of economic time series. Moreover, it explains theory based simultaneous equation model and provide more reliable forecasting than single variable time series. PVAR increases the power of analysis by increasing degree of freedom in case of developing countries where availability of data is limited (Good hart and Hofmann (2008). VAR model is a successful

and flexible methodology in case of multivariate time series analysis. It extend univariate autoregressive model to dynamic multivariate time series naturally and without losing information. This study used a data set for analysis contains six variables. Two are policy variable like monetary policy, money supply (M2), and fiscal policy, in literature there are Keynesian and monetarists theories to capture the role of internal shock in economic fluctuation. Moreover the other three variables which are considered as external shock to the economic performance are trade openness (export-imports/GDP), foreign direct investment, and foreign aid.

Econometric Model:

$X_t = A(L)\epsilon_t$

where $x_t = x_1 \ldots x_n$ is a vector that includes the country's GDP and both internal, monetary policy, fiscal policy, and external, FDI, trade openness, foreign aid, shocks to the country. Similarly A(*L*) is a matrix of distributed lags coefficients, and ϵ_t is a vector that shows all essential shocks that affect this economy, that may also be internal or external to the country. The index *t* reflects time period. The econometric model considers a set of variables to recover the pattern of shocks in 40 lower and middle income economies for the sampling period 1960 to 2012. Study used quarterly data extending from 1960Q1 to 2012Q4. This study applied VAR methodology, developed by Sims (1980), on a system of variable including GDP, M2, Govt. spending (G), trade openness, FDI and foreign aid. This system of variables helps

three commonly used fiscal policy variables, namely expenditure (spending), receipt (tax revenue) and the budget deficit (BD). This study used, govt. spending (G), to capture fiscal policy affects. Macroeconomic fluctuations are represented by mean value of GDP. These variables are selected   on   the   basis   of to identify and evaluate main possible source of disturbance in the developing economies. Study checked order of integration and presence of co integration between variables as prerequisite for econometric model estimation.

RESULTS AND CONCLUSION:

Prior to statistical analysis, non-stationary and Co integration are tested for unit roots and co integration. Staionarity of data implies that means and variances of data are constant over the time. To check the null hypothesis of non stationarity, Levin and Lin Test (1992), and I,m pesran test is utilized. Results are reported in table 1. Results indicate that data is stationary at first differences. If the data is sationary at first difference then in the next step we will check co integrated among variables. Mc. Coskey and Kao (1998) are used to test long run co integration among variables. Results are reported n table 2 which shows no long-run association among predetermined variables. Therefore, the econometric model is estimated in first differences without imposing any co integration relationship.

Table: 1 Unit Root Test
(Null-Hypothesis: There is unit root)

Ind. var	Method	Unit Root test with no trend		Unit Root test with trend	
		Level	1st difference	Level	1st difference
GDP	Levin, Lin & Chu t*	14.9394	-38.69*	20.6778	-44.5833*
	Im, Pesaran and Shin W-stat	-6.21829*	-58.35*	-5.49782	-32.8942*
gexp.	Levin, Lin & Chu t*	1.73858	-31.75*	0.51622	-3.57052*
	Im, Pesaran and Shin W-stat	1.67851	-32.75*	4.26669	-2.61100*
M2	Levin, Lin & Chu t*	0.56190	-17.5818*	0.61648	-23.4514*
	Im, Pesaran and Shin W-stat	0.78692	-18.8984*	0.38928	-17.7076*
FDI	Levin, Lin & Chu t*	3.53473	-25.6411*	7.53808	-28.6835*
	Im, Pesaran and Shin W-stat	-1.00306	-25.0573*	-0.35971	-22.5436*
ODA	Levin, Lin & Chu t*	-1.16566	-26.3538*	6.41057	-34.1728*
	Im, Pesaran and Shin W-stat	-3.74127	-24.1389*	1.54400	-23.9853*
Trade	Levin, Lin & Chu t*	10.1711	-34.7866*	19.9896	-43.2194*
	Im, Pesaran and Shin W-stat	-6.09606	-34.1184*	-4.90528	-33.0612*

In VAR, a standard lag length criterion is used to define the number of optimal lags. Most of the criteria indicate optimal lag length is 18 (Table 2), while only SC test indicated that optimal lag length is 10. Moreover, VAR lag exclusion Wald test (Table 3) is used to confirm that we

are not losing information by restricting the lag length that two lags are jointly significant for the system. Therefore, the VAR is estimated with two lags (p=2)

Table: 2 Lag Length Criteria

Endogenous variables: GDP, GEXP, M2, TRADE, ODA, FDI

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-18944.53	NA	9.03e+10	42.25314	42.28524	42.26540
1	-8298.199	21126.50	4.799449	18.59576	18.82047	18.68161
2	-6322.104	3894.911	0.063467	14.27002	14.68733	14.42946
3	-6282.643	77.25224	0.062981	14.26230	14.87222	14.49533
4	-6197.482	165.5749	0.056445	14.15269	14.95521	14.45931
5	-5901.694	571.1305	0.031630	13.57345	14.56858	13.95366
6	-5402.240	957.7042	0.011256	12.54011	13.72784	12.99390
7	-5368.351	64.52893	0.011311	12.54482	13.92515	13.07220
8	-5314.308	102.1812	0.010867	12.50459	14.07752	13.10556
9	-5151.904	304.8924	0.008200	12.22275	13.98829	12.89731
10	-4581.226	1063.740	0.002490	11.03060	12.98875*	11.77875
11	-4565.884	28.39085	0.002609	11.07667	13.22741	11.89840
12	-4541.002	45.71489	0.002675	11.10145	13.44481	11.99677
13	-4464.121	140.2191	0.002444	11.01030	13.54626	11.97921
14	-4225.676	431.7009	0.001557	10.55892	13.28748	11.60142
15	-4210.985	26.40051	0.001634	10.60643	13.52760	11.72252
16	-4191.521	34.71828	0.001697	10.64330	13.75707	11.83298
17	-4150.885	71.94004	0.001681	10.63297	13.93934	11.89623
18	-3909.376	424.3239*	0.001064*	10.17475*	13.67373	11.51160*
19	-3898.468	19.01934	0.001127	10.23070	13.92228	11.64113
20	-3883.814	25.35467	0.001184	10.27829	14.16248	11.76232

Table: 3 VAR Lag Exclusion Wald Tests

	GDP	GEXP	M2	TRADE	ODA	FDI	Joint
Lag 1	9425.706	12470.68	14307.10	8844.865	17036.33	12609.94	75317.94
	[0.000000]	[0.000000]	[0.000000]	[0.000000]	[0.000000]	[0.000000]	[0.000000]
Lag 2	1802.865	2338.969	2743.467	1618.440	3213.893	2525.255	14466.03
	[0.000000]	[0.000000]	[0.000000]	[0.000000]	[0.000000]	[0.000000]	[0.000000]
Df	6	6	6	6	6	6	36

Study also conducts some VAR authentication tests like roots of Characteristic Polynomial test used to check that VAR is stationary or not. Results indicate VAR is stationary and satisfy stability condition because modulus of root characteristics polynomial is less than 1 (Table 4). Similarly Granger Causality/Block Exogeneity Wald test is used to know that endogenous variables could jointly be treated as exogenous or not. Results (Table 5) indicate that we carry out the estimation with all the variables treated as endogenous variables. Normality test (Table 6) indicated that the residuals are not normally distributed. With lag selection fixed at 18, kao co integration test indicate that the variables are not co integrated in the long run. It allows us to estimate a VAR instead of a vector error correction model (VECM).

Table: 4 Roots of Characteristic Polynomial

Root	Modulus
0.993639	0.993639
0.979986 - 0.024839i	0.980301
0.979986 + 0.024839i	0.980301
0.849086 - 0.168040i	0.865554
0.849086 + 0.168040i	0.865554
0.826333 - 0.215497i	0.853970
0.826333 + 0.215497i	0.853970
0.805914 - 0.233436i	0.839041
0.805914 + 0.233436i	0.839041
0.809442 - 0.015295i	0.809586
0.809442 + 0.015295i	0.809586
0.779785	0.779785
No root lies outside the unit circle.	
VAR satisfies the stability condition.	

Table: 5 VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: GDP			
Excluded	Chi-sq	df	Prob.
GEXP	2.129071	2	0.3449
M2	3.330331	2	0.1892
TRADE	2.956020	2	0.2281
ODA	3.331477	2	0.1891
FDI	2.254355	2	0.3239
All	17.25676	10	0.0689

Table: 6

VAR Residual Normality Tests				
Orthogonalization: Cholesky (Lutkepohl)				
Null Hypothesis: residuals are multivariate normal				
Component	Skewness	Chi-sq	df	Prob.
1	-2.311259	871.6233	1	0.0000
2	-2.192743	784.5255	1	0.0000
3	-3.314341	1792.362	1	0.0000
4	0.837166	114.3549	1	0.0000
5	0.516304	43.49527	1	0.0000
6	2.171099	769.1141	1	0.0000
Joint		4375.475	6	0.0000
Component	Kurtosis	Chi-sq	df	Prob.
1	34.27180	39891.20	1	0.0000
2	47.81453	81923.62	1	0.0000
3	42.28632	62958.46	1	0.0000
4	149.3099	873210.9	1	0.0000
5	31.53807	33221.61	1	0.0000
6	34.54928	40602.29	1	0.0000
Joint		1131808.	6	0.0000
Component	Jarque-Bera	df	Prob.	
1	40762.82	2	0.0000	
2	82708.14	2	0.0000	
3	64750.82	2	0.0000	
4	873325.3	2	0.0000	
5	33265.11	2	0.0000	
6	41371.40	2	0.0000	
Joint	1136184.	12	0.0000	

Table: 7

Kao Residual Cointegration Test		
Series: GDP GEXP M2 TRADE ODA FDI		
Null Hypothesis: No cointegration		
	t-Statistic	Prob.
ADF	-1.036504	0.1500

### Response to Cholesky One S.D. Innovations ± 2 S.E.


Response of GDP to GDP
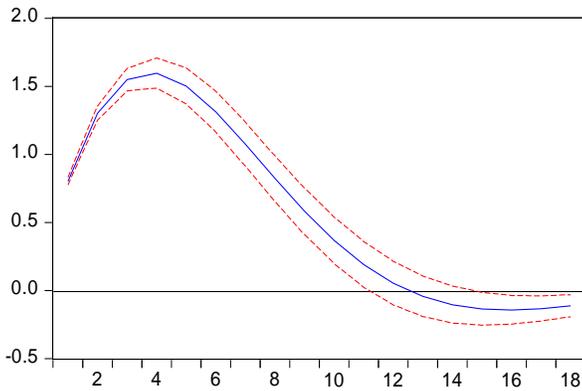
Response of GDP to GEXP
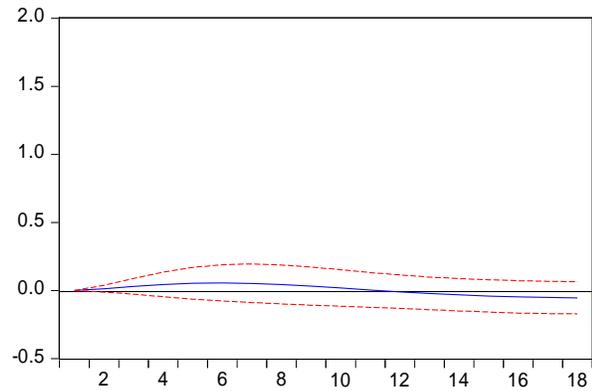
Response of GDP to M2
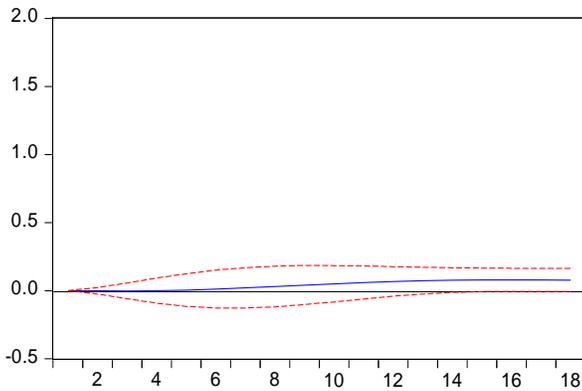
Response of GDP to TRADE
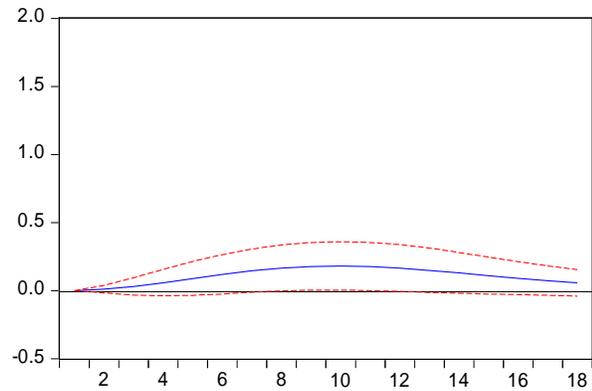
Response of GDP to ODA
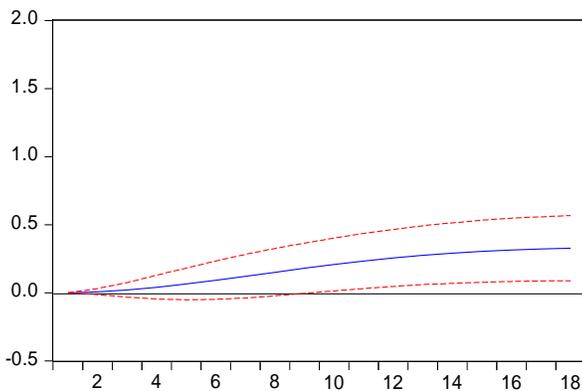
Response of GDP to FDI
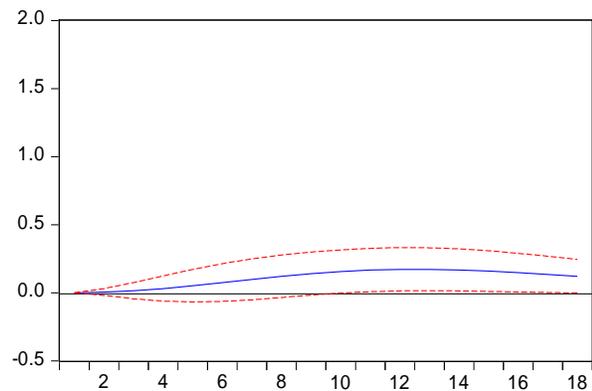
VAR results indicate that up to 4 quarter a positive shock to Gexp and m2 have no relationships with economic fluctuations. However, after 4 quarter although one standard shocks to policy variables have positive but weak relationship with economic fluctuations. Moreover, a positive shock to oda, trade and fdi bring positive and significant effect on economic fluctuations. Therefore, external shocks are more relevant to explain the variation in economic growth than internal shocks in developing countries.

Table: 8 Variance Decomposition of GDP

Period	S.E.	GDP	GEXP	M2	TRADE	ODA	FDI
1	0.803062	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	1.530578	89.98558	0.007268	0.000117	0.004135	0.002121	1.000778
3	2.177962	89.94218	0.021971	0.000180	0.020804	0.010127	1.004738
4	2.701626	89.85643	0.040361	0.000126	0.058702	0.028771	1.015614
5	3.093115	89.70930	0.059485	0.000227	0.126986	0.065203	2.038798
6	3.364636	89.47826	0.076858	0.001168	0.233289	0.129309	2.081113
7	3.539058	89.14100	0.090545	0.004086	0.381046	0.233450	2.149872
8	3.642732	88.68101	0.099435	0.010471	0.566837	0.391178	2.251067
9	3.700462	88.09360	0.103532	0.021881	0.779106	0.614845	2.387037
10	3.732400	87.38946	0.104025	0.039516	0.999676	0.912735	2.554587
11	3.752730	86.59327	0.102992	0.063815	1.208182	1.286993	2.744748
12	3.769863	85.73728	0.102767	0.094279	2.387622	1.733416	2.944633
13	3.787657	84.85311	0.105276	0.129618	2.528316	2.243095	3.140586
14	3.807033	83.96563	0.111617	0.168100	3.628697	2.804840	3.321114
15	3.827460	83.09098	0.122002	0.207939	3.693374	3.407151	3.478553
16	3.848010	82.23786	0.135956	0.247562	3.730094	4.039217	3.609315
17	3.867920	81.41023	0.152620	0.285755	4.747070	4.691127	3.713199
18	3.886788	80.60986	0.171027	0.321684	4.751334	5.353740	3.792356
Cholesky Ordering: GDP GEXP M2 TRADE ODA FDI							

In a VAR system, variance decomposition provides information on the relative importance of each innovation in affecting the variables in the VAR system. Estimated variance decomposition results are given in Table 8. Clearly the majority of the variation in GDP growth is caused by itself. The economic growth in the past years appears to generate a momentum for it to grow. 89 per cent of the variation of GDP due to innovations is caused by itself in the short run, while in the long run its own contribution drops to 80%. Contribution of FDI in variation of gdp growth increases from almost zero to 3.79%, while ODA accounts for 5.35 per cent for variation. The contribution of the trade liberalization to economic disturbance increases over time, the share rising to 4.75 per cent. While the GEXP and M2 contribution is .17% and .32% in GDP variation. Surprisingly the results are indicating that fiscal and monetary policy in developing countries have negligible role in economic destabilization while factor that are difficult to control by LDCs have major and significant contribution in business cycle. The above results indicate that there are three main channels of transmission of external shocks to developing countries: FDI, ODA and trade openness. The results also indicate that expansionary fiscal policies may be ineffective in stimulating developing economies. The central bank policy rate is also an ineffective policy instrument in developing countries. Conclusively external variable are liable for economic variations.

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